

March 28, 2002

MEMORANDUM TO: File

FROM: George F. Dick, Jr., Sr. Project Manager, Section 2 /RA/  
Project Directorate III  
Division of Licensing Project Management, NRR

SUBJECT: TELEPHONE CONVERSATION WITH EXELON GENERATION  
COMPANY, LLC REGARDING THE INSPECTION OF THE REACTOR  
VESSEL HEAD OF BYRON STATION, UNIT 1

Byron Unit 1 had come offline on March 12, 2002, and was in a refueling outage when Bulletin 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity," was issued. Since the unit would have restarted prior to the date by which all PWR licensees were required to provide the information requested in the Bulletin, a conference call was held on March 22, 2002, with Exelon Generation Company, LLC (the licensee) to discuss the extent and results of the reactor vessel head inspection conducted during the outage. At the time of the telephone call, the unit had been refueled and was in Mode 6 with the reactor vessel head reinstalled.

The conversation is summarized below:

During the current refueling outage, the licensee conducted a visual inspection of the insulation that is attached to head for indications of boron deposition. They found none. Further, they also did a limited inspection around the head in the vicinity of the reactor head vent which had been a source of leakage during an earlier cycle. This inspection involved prying up the insulation and looking at the bare metal of the head with a camera. There was no indication of metal loss on the reactor vessel near the head vent and no indication of boron deposition on the head surface.

While a 100 percent bare metal inspection of the reactor vessel head could be performed, Exelon did not conduct such an inspection during the outage. The insulation on the head is not readily removable. The insulation is comprised of reflective stainless steel sandwich pieces which are assembled in a puzzle matrix. Installation begins at the center of the head and assembled outward to the edge. Removal of the insulation would take approximately 2 days with an accompanying dose of 4 to 5 Rem.

There have been two recorded instances of leaks above the head area since initial startup of Byron, Unit 1. The first was discovered in 1990 during the third refueling outage. A head vent valve leaked a small amount of liquid through the insulation and onto the head. There was a slight glazing of boric acid on the head. The head area was cleaned and inspected to ensure that there was no residual boric acid. The second leak was from a conoseal joint on an instrument line. It was identified and cleaned up during the 1997/1998 refueling outage. There was no indication of a loss of reactor vessel material in either case.

There have been other minor leaks above the vessel head, however, none of those leaks have reached the head.

The Byron Unit 1 boric acid corrosion prevention program requires boric acid to be cleaned off the reactor vessel head and the head surface inspected.

In response to a staff question regarding inspection of "J groove" welds at the base of the control rod drive nozzles, the licensee indicated that they have had no indications of cracks at or near those welds. The visual inspection, which was conducted on these welds during this outage, was not designed to detect cracking. Cracking of the nozzles would not be expected based on the relatively low operating temperature in the reactor pressure vessel head region (i.e., Byron Unit 1 is a low susceptibility plant as discussed in Bulletin 2001-01).

The licensee indicated that they have been monitoring the circumstances described in Bulletin 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles," and Bulletin 2002-01, and they are incorporating the information into their inspection program.

While inspecting the bottom of the reactor vessel on March 24, 2002, the licensee noticed a wet trail of stain on the outside of the bottom of the reactor vessel and on the thimble tubes that extend below the bottom of the vessel. A conference call with the licensee, NRR, and Region III was held on March 25, 2002, to discuss the findings.

The licensee informed the NRC staff that the stain was iron oxide because it was reddish-brown and easily removed from the reactor vessel. There was no indication of boric acid deposits on the vessel. It appears that the vessel surface was affected only to a depth of 1 to 2 mils. The licensee concluded that the cause of the stain was a small leak in the reactor cavity boot seal joint during refueling operations.

The licensee obtained a sample of the material for analysis. They will determine if the material should be removed from the reactor vessel and, if so, they will develop a plan to be implemented during the next refueling outage. Westinghouse was consulted by the licensee and was informed that no further corrosion to the reactor vessel was anticipated due to the stains. In addition, the licensee will pay close attention to the installation of the reactor cavity boot seal during future refueling outages to reduce the possibility of seal leaks.

Byron Unit 1 is scheduled to restart by the end of March 2002.

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